Agricultural Extension Service ● University of Minnesota

FACT SHEET

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Effect of TIBA on Height, Lodging, and Yield of Soybeans

TIBA (2, 3, 5-triiodobenzoic acid) is a growth regulator which retards soybean vegetative growth. Soybean varieties adapted to the northern corn belt bloom and set pods in the middle and lower portion of the plant as leaf and stem growth continues at the tips of stems and branches. Foliar application of TIBA temporarily reduces leaf and stem growth; consequently, more of the first produced flowers remain on the plant and produce pods. TIBA is sold under the trade name REGIM-8 and has USDA Pesticide Regulation Division clearance for application on soybeans at rates not to exceed 3/4 ounce per acre. TIBA should not be used on soybeans grown for forage.

TIBA-treated plants are drastically different in shape from untreated plants. The petioles of the upper part of the treated plant are shorter and more vertically oriented than those of the untreated plant, and branching increases. As a result the plant canopy is more triangular in shape.

The leaflets are smaller, darker, thicker, and more crinkled than those of untreated plants, resulting in less leaf area per plant. Plant height is less than normal because of shorter internodes. Therefore, the plants stand more erect and have a higher degree of lodging resistance.

TIBA treatment increases the number of pods per plant without reducing the number of seeds per pod; therefore, more seeds are produced per plant. However, TIBA treatment reduces seed size (weight per 100 seeds). The reduction in seed size may be large enough to offset the increase in seed number so that total yield is not greatly affected. Yield results are quite variable as indicated by studies conducted by experiment stations and industry on both small- and field-sized plots. Yield changes have ranged from a 9 bushel per acre decrease to a 11 bushel per acre increase for TIBA-treated plots compared to untreated plots.

The effect of TIBA on soybeans in Minnesota has been studied on several varieties. The changes in soybean yields shown in tables 1 and 2 are small and not significantly different.

Table 1. Average yield, height, and lodging rating of TIBA-treated and untreated soybeans grown at Lamberton and Waseca, 1965-66

Variety	Yield: Untreated (bushels per acre)	Yield: Yield change due to TIBA treatment	Lodging [1]: Untreated	Lodging [1]: TIBA treated	Height decreases due to TIBA treatment (inches)
Traverse [2]	31.8	.4	1.8	1.2	8
Chippewa 64	35.6	-2.0	1.6	1.2	13
Hark [3]	41.9	.9	1.5	1.0	5
Amsoy [3]	41.6	1.2	2.3	2.0	3

1 1=all plants standing, 5=all plants down.
2 1965 only.
3 1966 only.

Less lodging is noted on TIBA-treated plots for all varieties, even though lodging was not severe on the untreated plots. Height reduction due to TIBA application varied with variety; Chippewa 64, Traverse, and Merit were affected more than the other varieties.

Table 2. Average yield, height, and lodging rating of TIBA-treated and untreated soybeans grown at Lamberton, Morris, St. Paul, and Waseca, 1968-69.

Variety	Yield: Untreated (bushels per acre)	Yield: Increase due to TIBA treatment	Lodging [1]: Untreated	Lodging [1]: TIBA treated	Height decrease due to TIBA treatment (inches)
Clay [2/3]	31.0	1.9	1.6	1.2	2
Merit [4]	31.6	.6	2.0	1.4	5
Chippewa 64 [3]	31.8	1.0	2.0	1.1	6
Hark [4]	32.8	.4	1.7	1.6	2
Corsoy [5]	37.3	.4	2.7	2.3	3
Amsoy [6]	35.4	.6	2.7	2.2	4

1/ 1=all plants standing, 5=all plants down.
2/ 1969 only.
3/ Morris and Rosemount locations.
4/ All locations.
5/ Lamberton, Waseca, and Rosemount locations.
6/ Lamberton and Waseca locations.

Table 3. Average yield and lodging rating of TIBA-treated and untreated soybeans in three row widths at Lamberton, Morris, St. Paul, and Waseca, 1968-69.

	Row width (inches) 6	20	30
Yield (bushels per acre)			
Untreated	32.6	34.8	33.5
TIBA treated	33.0	35.7	33.7
Lodging rating [1]			
Untreated	2.1	2.1	2.0
TIBA treated	1.6	1.3	1.7

1/ 1=all plants standing, 5=all plants down.

The effect of TIBA application was also studied on soybeans grown in 6-, 20-, and 30-inch row widths. Table 3 contains lodging and yield results.

Maximum yield was obtained in 20-inch rows in both TIBA-treated and untreated plots. The yield change due to TIBA is small and not significantly different for any of the row widths. Lodging was not severe enough for row width or TIBA to have a measurable effect.

The decision to use TIBA as a soybean production practice should be based on economics. From the yield data in tables 1 and 2, the application of TIBA does not appear to offer an economic advantage. However, soybean producers who are looking for that extra bushel may want to try TIBA on a small acreage. If so, also consider other production factors:

1) Variety—Check label for varieties that are not recommended for use with TIBA. Chippewa is one such variety.

2) Date of planting—Consider application on early-planted soybeans because they usually grow taller and hence lodge more.

3) Row width—TIBA causes less vegetative growth and may reduce yields, if row spacing is greater than 30 inches. Therefore, use of TIBA should be restricted to soybeans grown in rows 30 inches wide or less.

4) Time and rate of application—The recommended time of application is the 1/10 bloom stage; i.e., when 1 out of 10 plants shows at least one flower (5 to 8 trifoliolate leaf stage). Close observation is required to identify this stage of soybean development; soybeans are in this stage for a relatively short period of time (1-2 days). Earlier applications severely stunt the plants, depress yields, and delay maturity. Rates higher than recommended also cause severe stunting, delay maturity, and depress yields. Application of TIBA at stages later than 1/10 bloom or at rates lower than recommended do not cause a measurable effect on the plants. Follow the directions on the label.

5) Harvestability—Combining may be easier because of less plant lodging. This may increase yield by reducing harvest losses. On the other hand, the tendency for pods to be produced lower on the plant may require slower combine ground speed and lower cutter bar height and may reduce yields.

Summary

Foliar applications of the chemical TIBA made at the onset of flowering reduced plant height and the degree of lodging. Yields on the hand-harvested plots were not significantly affected. In similar studies conducted by both private and public researchers in other states, greatest yield responses to TIBA have been observed with early planting of full-season varieties in narrow rows at high plant populations with high soil fertility and good weed and pest control. If the soybean production system does not include these criteria, a yield increase from an application of TIBA should not be expected.

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